

Title (en)  
HIGH-STRENGTH NON-ORIENTED ELECTRICAL STEEL SHEET

Title (de)  
HOCHFESTES NICHTORIENTIERTES ELEKTROSTAHLBLECH

Title (fr)  
TÔLE D'ACIER MAGNÉTIQUE NON ORIENTÉE À HAUTE RÉSISTANCE

Publication  
**EP 2698441 B1 20201104 (EN)**

Application  
**EP 12771871 A 20120411**

Priority

- JP 2011089529 A 20110413
- JP 2012059886 W 20120411

Abstract (en)  
[origin: EP2698441A1] A high-strength non-oriented electrical steel sheet contains: in mass%, C: 0.010% or less; Si: not less than 2.0% nor more than 4.0%; Mn: not less than 0.05% nor more than 0.50%; Al: not less than 0.2% nor more than 3.0%; N: 0.005% or less; S: not less than 0.005% nor more than 0.030%; and Cu: not less than 0.5% nor more than 3.0%, a balance being composed of Fe and inevitable impurities. An expression (1) is established where a Mn content is represented as [Mn] and a S content is represented as [S], and not less than  $1.0 \times 10^4$  pieces nor more than  $1.0 \times 10^6$  pieces of sulfide having a circle-equivalent diameter of not less than 0.1  $\mu\text{m}$  nor more than 1.0  $\mu\text{m}$  are contained per 1 mm<sup>2</sup>.

IPC 8 full level  
**H01F 1/16** (2006.01); **C22C 38/00** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/16** (2006.01); **H01F 1/01** (2006.01); **C21D 8/12** (2006.01)

CPC (source: EP KR US)  
**C21D 8/1222** (2013.01 - KR); **C21D 8/1233** (2013.01 - KR); **C21D 8/1261** (2013.01 - KR); **C21D 8/1272** (2013.01 - KR); **C22C 38/00** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP KR US); **C22C 38/04** (2013.01 - EP KR US); **C22C 38/06** (2013.01 - EP KR US); **C22C 38/16** (2013.01 - EP KR US); **H01F 1/01** (2013.01 - KR US); **H01F 1/16** (2013.01 - EP KR US); **C21D 8/1222** (2013.01 - EP US); **C21D 8/1233** (2013.01 - EP US); **C21D 8/1261** (2013.01 - EP US); **C21D 8/1272** (2013.01 - EP US)

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)  
**EP 2698441 A1 20140219**; **EP 2698441 A4 20150128**; **EP 2698441 B1 20201104**; BR 112013014058 A2 20160913; BR 112013014058 B1 20191112; CN 103261463 A 20130821; CN 103261463 B 20151125; JP 5267747 B2 20130821; JP WO2012141206 A1 20140728; KR 101570591 B1 20151119; KR 20130125830 A 20131119; PL 2698441 T3 20210125; TW 201247891 A 20121201; TW I445828 B 20140721; US 2014030135 A1 20140130; US 9362032 B2 20160607; WO 2012141206 A1 20121018

DOCDB simple family (application)  
**EP 12771871 A 20120411**; BR 112013014058 A 20120411; CN 201280004130 A 20120411; JP 2012059886 W 20120411; JP 2012544365 A 20120411; KR 20137025553 A 20120411; PL 12771871 T 20120411; TW 101113004 A 20120412; US 201214111245 A 20120411